



## Tracking of Occupational Heat-Related Illness in California, 2000 - 2007

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### May 14, 2008



- Maria Isabel Vasquez Jimenez, age 17 – 2 months pregnant
- Immigrant from Oaxaca
- Pruning grapes, employed by labor contractor x 3 days
- Max temp 91 °F in Farmington, CA
- Collapsed and taken by driver to clinic with core temp = 108.4 °
- Died 2 days later

"Maria's death should have been prevented, and all Californians must do everything in their power to ensure no other worker suffers the same fate."  
- Gov. Arnold Schwarzenegger, May 28, 2008

Source: The Sacramento Bee, 05/29/08



## Occupational HRI Incidence

- **Millican R, Baker RC, Cook GT.** Controlling heat stress: administrative versus physical control. *Am Ind Hyg Assoc J.* 1981; 42:411-6.
- **Dinman BD, Horvath SM.** Heat disorders in industry: a reevaluation of diagnostic criteria. *J Occ Med.* 1984;26(7):489-95.
- **Donaghue AM.** Heat illness in the U.S. mining industry. *Am J Ind Med.* 2004;45:351-6.
- **Bonauto D, Anderson R, Rauser E, Burke B.** Occupational heat illness in Washington State, 1995-2005. *Am J Ind Med.* 2007;00:1-11.

## Surveillance of Occupational HRI Occupational Health Branch, CDPH

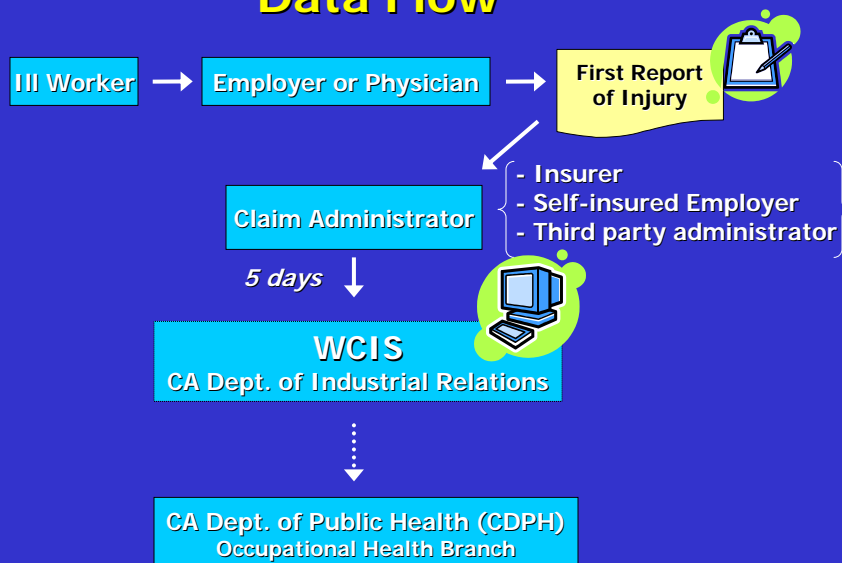
- Statewide, multisource surveillance to:
  - Detect cases of occupational HRI
  - Characterize disease and exposures
  - Calculate incidence
  - Identify areas for targeting prevention



## Data Source

- **Workers' Compensation Information System (WCIS) : WC Claims**
  - 2000 - 2007 data
  - Electronic data transmission
  - Division of Workers' Compensation, CA Dept. of Industrial Relations
  - Title 8, California Code of Regulations, sections 9700-9704

## Data Flow



## Surveillance Case Definition

- Date of Injury: 1/1/2000 – 12/31/2007
- Include all HRI claims (heat rash → heat stroke)
- Exclude burns and skin cancers
- Possible cases

- Vineyard worker
- Male
- Age 30
- 7/18/2006



- Due to excessive heat, the employee felt dizzy and fainted. Taken to hospital treated for heat exhaustion.

Note: Picture not of victim; included only to represent occupation

- **Roofer**
- **Male**
- **Age 21**
- **7/14/2004**



- **Employee began to feel dizzy/passed out on roof; heat exhaustion due to temperature extremes.**

Note: Picture not of victim; included only to represent occupation

- **Firefighter**
- **Male**
- **Age 29**
- **7/5/2006**



- **Heat Prostration while fighting a grass fire, pulling and cutting lines, employee became sick, stopped sweating and felt lightheaded. He vomited multiple times.**

Note: Picture not of victim; included only to represent occupation

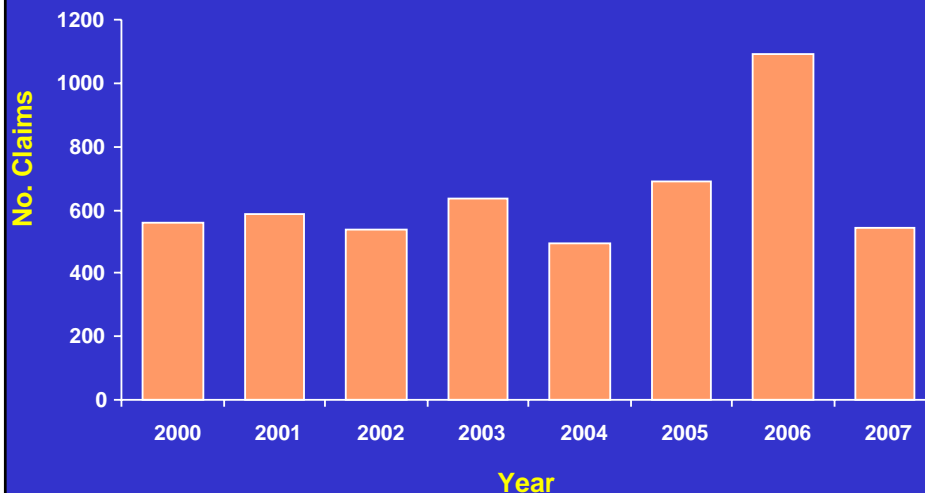
- Mover
- Male
- Age 46
- 7/22/2005

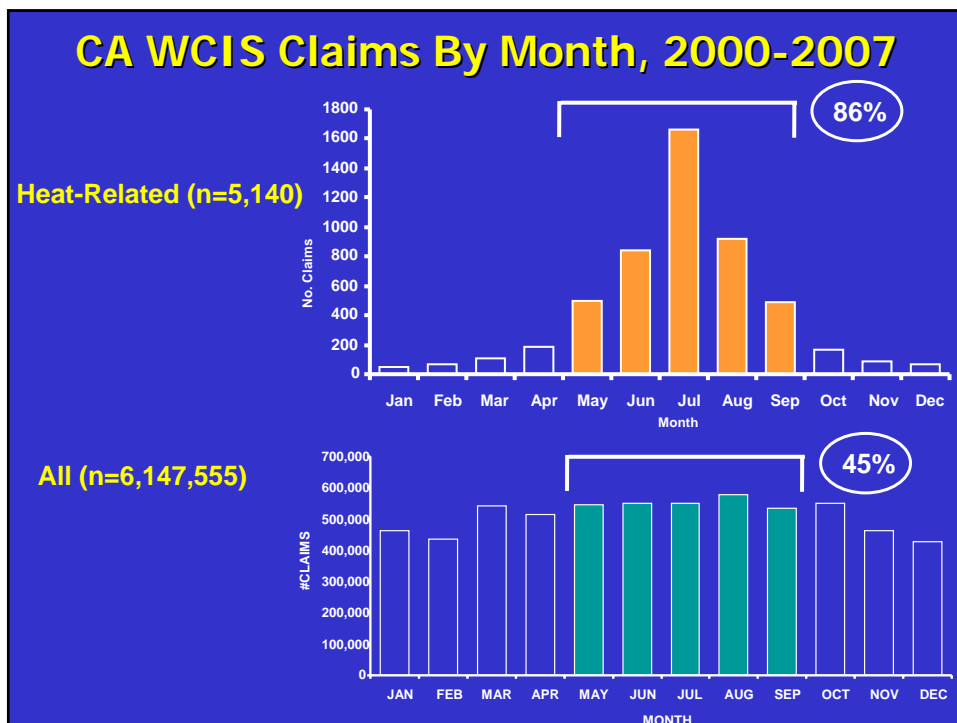
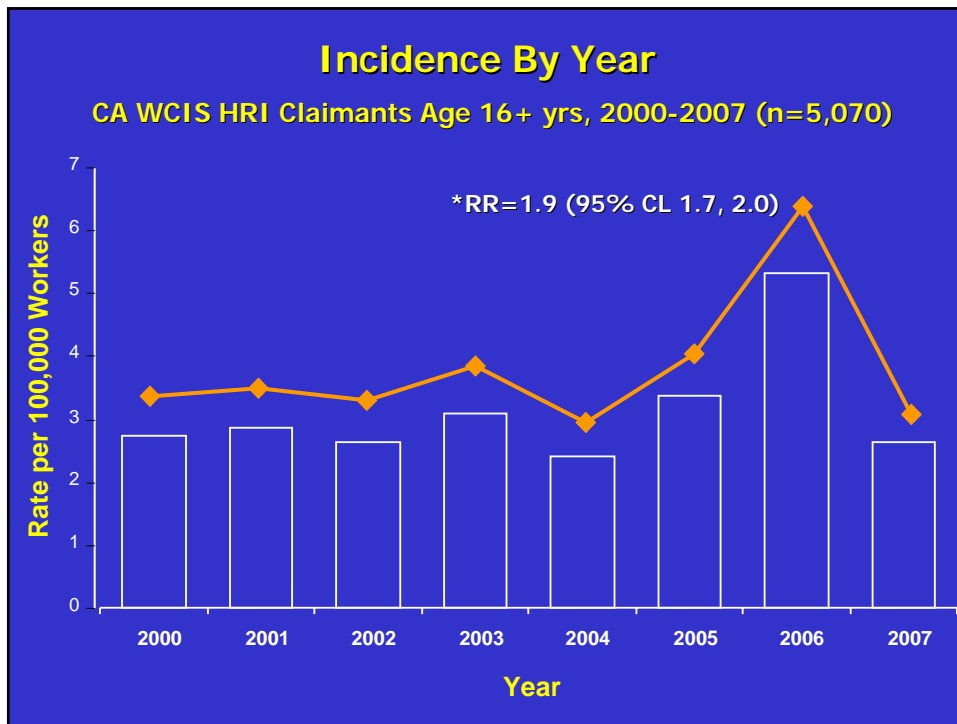


- Employee overheated, was resting in air-conditioned cab drinking water, had seizures/convulsions, slipped into coma. Is now deceased.

Note: Picture not of victim; included only to represent occupation

### CA WCIS Heat-Related Claims By Year 2000-2007 (n=5,140)





### WCIS Heat-Related Illness Claims By Age, 2000-2007 (n=5,140)

Age (yrs)	No.Claims (%)	Rate per 100,000 Workers	
Under 16	21 (0.4)	n/a	
16-19	226 (4.4)	4.3	
20-24	681 (13.3)	5.0	
25-34	1387 (27)	4.5	
35-44	1176 (22.9)	3.4	
45-54	1020 (19.8)	3.4	
55-64	475 (9.2)	3.2	
Over 65	105 (2.0)	2.7	
Missing	49 (1.0)	n/a	
<b>Total</b>	<b>5,140 (100)</b>	<b>3.9</b>	p<0.001

### WCIS Heat-Related Illness Claims By Gender and Ethnicity, 2000-2007 (n=5,070\*)

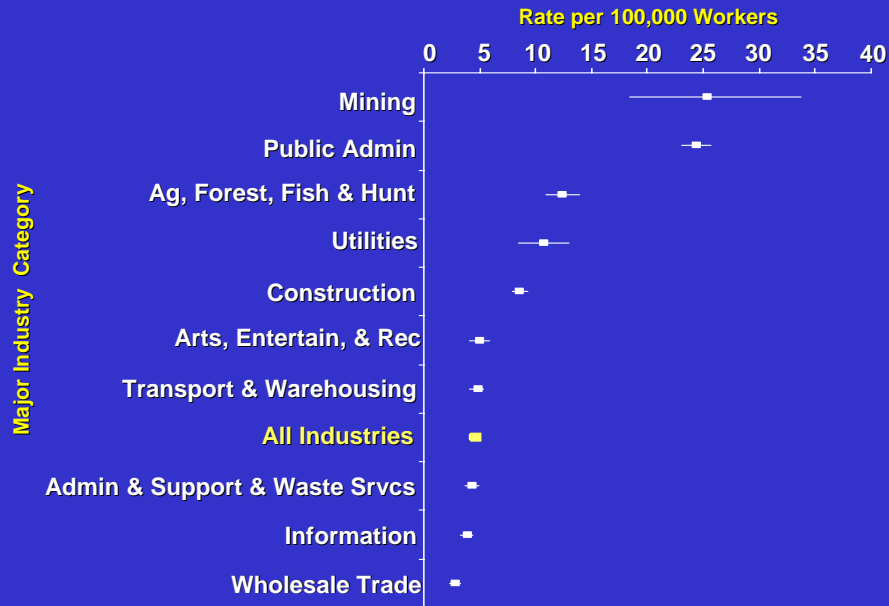
Gender	No.Claims (%)	Rate per 100,000 Workers	
Male	3,763 (74)	5.1	
Female	1,264 (25)	2.1	
Unknown	43 (1)	n/a	p<0.001
<b>Ethnicity</b>			
Hispanic	1,648 (32.5)	4.1	
Non-Hispanic	3,422 (67.5)	3.7	p<0.01
<b>Total</b>	<b>5,070 (100)</b>	<b>3.8</b>	

\* Age 16 +



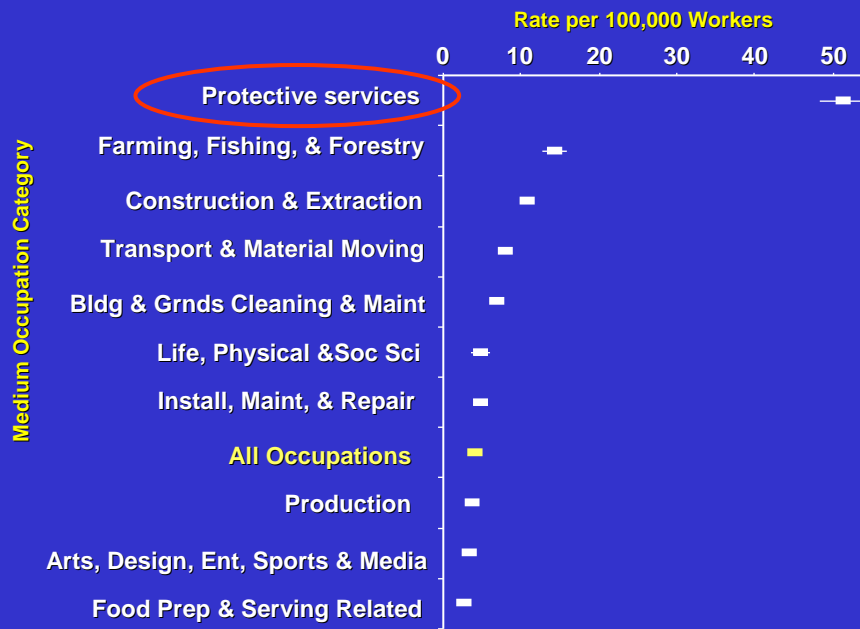
## Top 10 Rates by Major Industry Category

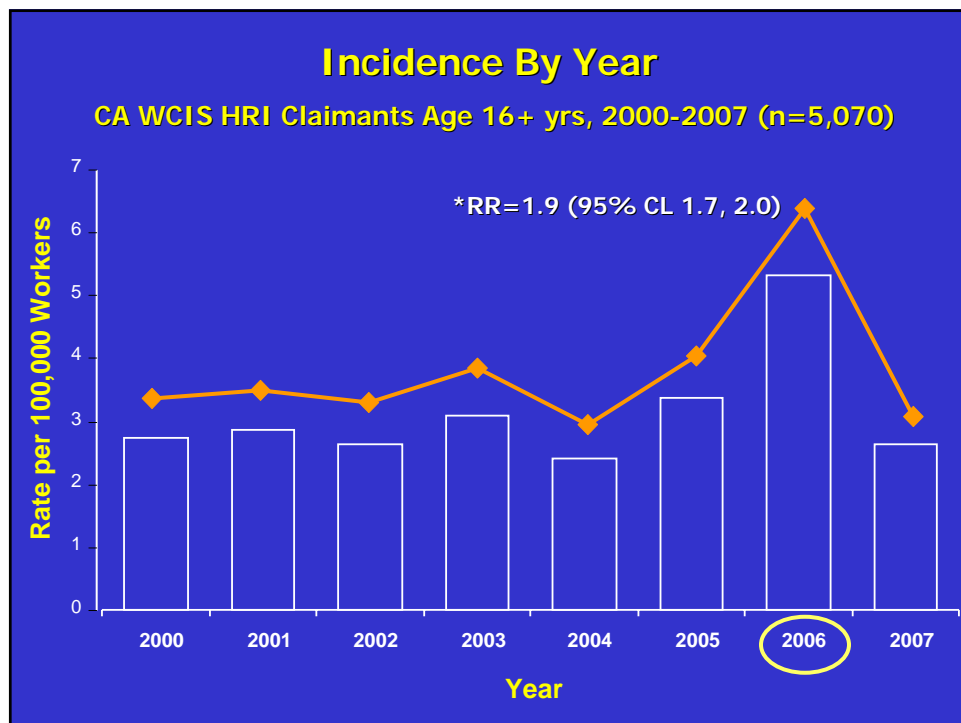
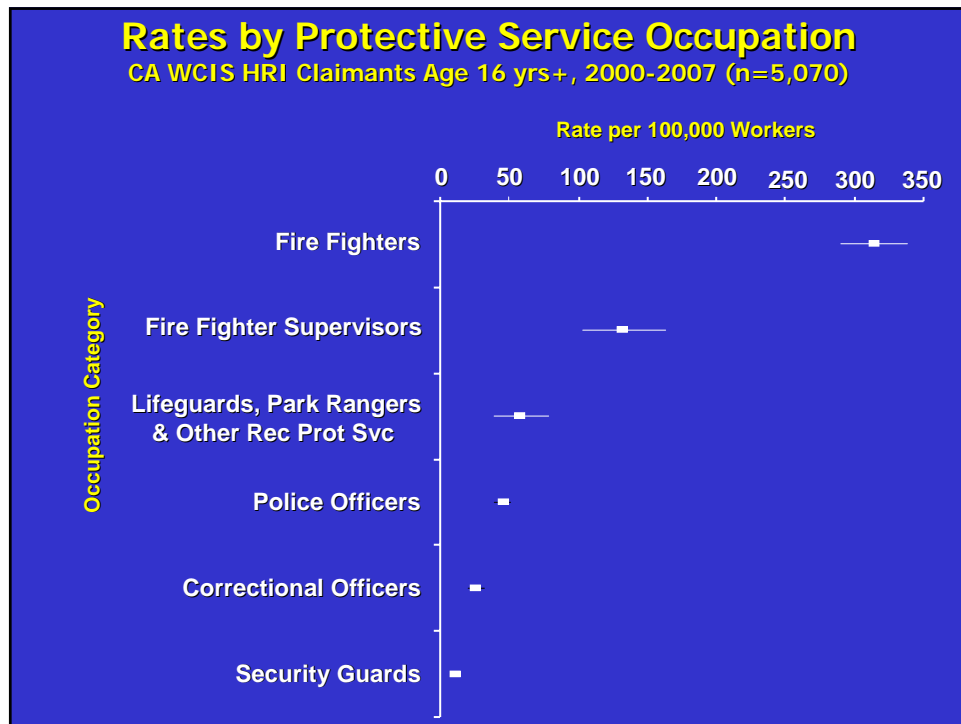
CA WCIS HRI Claimants Age 16+ yrs, 2000-2007 (n=5,070)



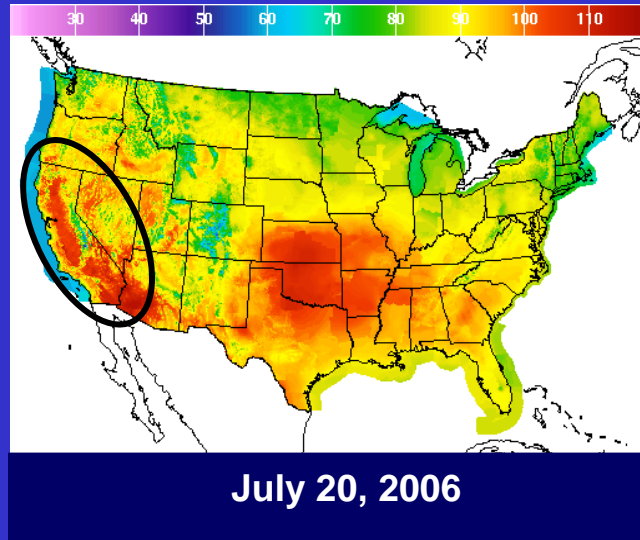
## Top 10 Rates by Occupation Category

CA WCIS HRI Claimants Age 16+ yrs, 2000-2007 (n=5,070)





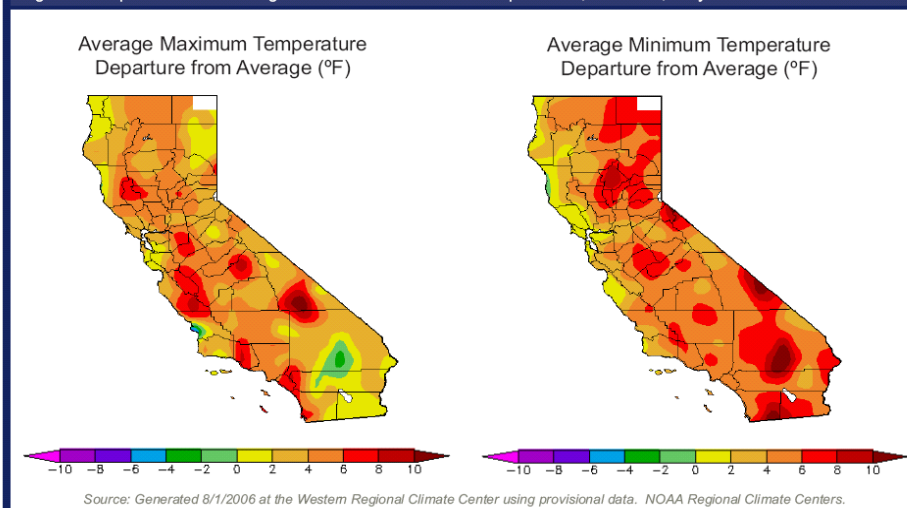
## July 2006 California Heat Wave



\*Slide from Thomas Kim, CDPH

## July 2006 California Heat Wave

Figure 4: Departures from Average Maximum and Minimum Temperatures, California, July 2006



Source: CDPH. Public Health Impacts of Climate Change in California: Community Vulnerability Assessments and Adaptation Strategies Report No. 1: Heat-Related Illness and Mortality. July 2007.

## Heat Wave HRI Claims Analysis<sup>\*</sup>

- **Heat Wave Period**
  - July 15 – August 1, 2006
- **Referent Period**
  - July 8 – 14, 2006 and August 12 – 22, 2006
  - Same number of days (18)
  - Equal distribution of days of the week



\*Methods: Knowlton K, et al. 2008.

## Heat Wave HRI Claims Analysis

- Heat wave period: n = 474 HRI claims
- Referent period: n = 85 HRI claims

→ 389 excess HRI claims during heat wave period

Rate Ratios for HRI claims by age, gender and ethnicity during the July 2006 heat wave		Demographic Characteristic	Rate Ratio (95% CL)
	Age (yrs)	16-19	3.3 (1.4, 8.3)
		20-24	8.3 (3.6, 23.8)
		25-34	5.5 (3.4, 9.0)
		35-44	4.9 (3.1, 8.1)
		45-54	5.6 (3.3, 10.0)
		→ 55-64	8.7 (4.0, 22.6)
		Over 65	3.3 (0.86, 18.9)
	Gender	Female	6.6 (4.0, 11.4)
		Male	5.4 (4.1, 7.1)
	Ethnicity	Non-Hispanic	5.1 (3.8, 7.0)
		Hispanic	6.4 (4.3, 9.6)
		Overall	5.6 (4.4, 7.1)

Rate Ratios for HRI Claims by Industry July 2006 Heat Wave		
Industry Category	Rate Ratio (95% CL)	
Wholesale Trade	15.0	(2.3, 631.5)
Retail Trade	13.5	(3.4, 117.1)
→ Ag, Forest, Fish & Hunt	11.1	(5.2, 28.6)
Utilities	8.0	(1.1, 355)
Admin, Support & Waste Svcs	7.7	(2.3, 39.9)
Construction	7.1	(3.5, 16.3)
Accommod & Food Services	6.5	(1.5, 59.3)
Prof, Sci & Tech Services	6.0	(0.7, 276)
Information	4.3	(1.2, 23.7)
Transport & Warehousing	4.0	(1.3, 16.4)
Arts, Entertainment & Rec	4.0	(1.3, 16.4)
Other Services	4.0	(0.4, 197)
Educational Services	4.0	(0.8, 38.7)
Manufacturing	3.9	(2.0, 8.4)
→ Public Administration	3.4	(2.2, 5.3)
→ Mining	2.5	(0.4, 26.3)
All Industries	5.6	(4.4, 7.1)

### Rate Ratios for HRI claims by Occupation Selected Occupations July 2006 Heat Wave

Occupation Category (COC)	Rate Ratio (95% CL)
Farmworkers (605)	13.3 (5.9, 37.4)
Carpenters (623)	11.0 (1.6, 473.5)
Laborers & Freight, Stock, & Material Movers (962)	8.0 (2.4, 41.5)
Truck/Delivery Drivers (913)	5.8 (2.0, 22.9)
Construction Laborers (626)	3.6 (1.5, 9.8)
Production Workers (896)	3.3 (1.3, 10.1)
Fire Fighters (374)	2.6 (1.2, 6.0)
Landscaping & Groundskeeping Workers (425)	2.4 (1.0, 6.9)
Police & Sheriff's Patrol Officers (385)	2.2 (0.8, 7.0)
<b>All Occupations</b>	<b>5.6 (4.4, 7.1)</b>

## Take Home Points

- Occupational HRI is a problem in California
  - Across a wide range of industries and occupations
  - Especially during hotter months and heat waves
- Workers need to be considered at-risk population in public health HRI prevention efforts
  - Cannot assume that the Heat Illness Prevention Standard will solve problem
  - Public health messages to prevent occupational HRI should be incorporated into community messages, especially during heat waves
- WCIS can render useful information for public health surveillance purposes
  - Needs to be incorporated into system of ongoing data tracking for HRI to evaluate effectiveness of enforcement and prevention efforts

## Limitations of WCIS

- No ICD-9 or E-codes
- No NAICS or COC codes
- No ethnicity data
- Inconsistent and not uniformly coded data on work tasks
- Lost work time and cost difficult to derive

## Next Steps

- Continue data analysis
  - Geographic analysis
  - Weather data
- Evaluate surveillance system
  - Assess data usefulness
  - Evaluate system attributes

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## Heat-Related Illness

### *Report No. 1: Heat-Related Illness and Mortality Public Health Impacts of Climate Change in California: Community Vulnerability Assessments and Adaptation Strategies*

- California Department of Public Health
- Available at:  
<http://ehib.org>

